REMARKS

In response to the Office Action dated June 6, 2007, claims 1, 13, and 18 have been amended and claims 4, 15, and 16 have been canceled. Therefore, claims 1-3, 5-14, and 17-24 are now in the case. In light of the amendments and arguments set forth herein, reexamination and reconsideration of the application are requested.

Drawing Objection

The Office Action Summary section, under "Application Papers" (item #10), was checked stating that the drawings filed on 12 December 2003 are objected to by the Examiner. However, no further mention of the drawing objections was made. Therefore, the Applicant is unable to respond to the drawings objection until more specific details are provided.

Claim Objection

The Office Action objected to claim 1 because of an informality. In particular, in line 6 of claim 1 the phrase "of list" should have been "a list of".

In response, the Applicant has amended claim 1 as suggested by the Office Action. Therefore, the Applicant respectfully submits that the objection of claim 1 has been overcome based on the amendment to claim 1.

Section 112, Second Paragraph Rejections

The Office Action rejected claim 13 under 35 U.S.C. § 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter that the Applicant regards as the invention. In particular, the Office Action stated that "[S]ince there are more than one histogram (at least one each for a row and a column), it is not clear which one is being referred to; therefore the mete and bound of the claim cannot be ascertained."

In response, the Applicant has amended claim 13 to clarify that a pixel color of each histogram is designated as a candidate background color when a pixel frequency value of the pixel color is greater than a frequency threshold. Based on this amendment

to claim 13 the Applicant respectfully submits that amended independent claims 13is patentable under 35 U.S.C. § 112, second paragraph. The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claim 13 under 35 U.S.C. § 112, second paragraph.

Section 103(a) Rejections

The Office Action rejected claims 1-3, 5-7, 9, 11-14, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. (U.S. Patent No. 7,085,413) in view of a paper by Nishida et al. entitled "Restoring Color Document Images with Show-Through Effects by Multiscale Analysis". The Office Action contended that Huang et al. teach all the elements of the Applicant's claimed invention, except that Huang et al. do not "expressly disclose that a histogram is computed for each row and each column and that the most common candidate color is selected from the candidate list formed over all histograms." However, the Office Action stated that Nishida et al. teach "analyzing each row and column in order to determine the background color." Therefore, the Office Action stated that "it would have been obvious to modify Huang with the teachings of Nishida" to "avoid distortion that can arise when the image area used to estimate the background color is too large."

In response, the Applicant respectfully traverses these rejections. In general, the Applicant submits that the combination of Huang et al. and Nishida et al. is lacking several elements of the Applicant's claimed invention. More specifically, neither Huang et al. nor Nishida et al. disclose, either explicitly or implicitly, the material claimed features of:

1. (recited in amended independent claim 1): generating a frequency distribution of pixel colors for each axis scan line in a first direction and for each axis scan line in a second direction of the scanned image, wherein each axis scan line in the first direction and each axis scan line in the second direction are not orthogonal to each other;

2. (recited in amended independent claim 13): detecting and segregating the objects within the scanned image using the variance of the estimated background color.

3. (recited in amended independent claim 18): a first axis scan line in a first direction and a second axis scan line in a second direction, the first axis scan line and the second axis scan line being non-orthogonal to each other;

Further, the combination of Huang et al. and Nishida et al. fails to appreciate the advantages of these claimed features. In addition, there is no technical suggestion or motivation disclosed in either Huang et al. or Nishida et al. to define these claimed features. Thus, the Applicant submits that the combination of Huang et al. and Nishida et al. cannot make obvious the Applicant's claimed features listed above.

To make a prima facie showing of obviousness, all of the claimed features of an Applicant's invention must be considered, especially when they are missing from the prior art. If a claimed feature is not disclosed in the prior art and has advantages not appreciated by the prior art, then no prima facie showing of obviousness has been made. The Federal Circuit Court has held that it was an error not to distinguish claims over a combination of prior art references where a material limitation in the claimed system and its purpose was not taught therein. *In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Moreover, as stated in the MPEP, if a prior art reference does not disclose, suggest or provide any motivation for at least one claimed feature of an Applicant's invention, then a prima facie case of obviousness has not been established (MPEP § 2142).

Amended Independent Claim 1

Amended independent claim 1 recites a computer-implemented method for estimating a background color of a scanned image. The method includes generating a frequency distribution of pixel colors for each axis scan line in a first direction and for each axis scan line in a second direction of the scanned image. Each axis scan line in

the first direction and each axis scan line in the second direction are not orthogonal to each other. The method also includes compiling a list of candidate colors based on the frequency distributions, determining a most common candidate color from the list of candidate colors, and designating the most common candidate color as the estimated background color.

The Applicant's specification states that a "coordinate system is used to dictate the directions (such as rows and columns) in which the scanned image will be analyzed" (specification, page 16, lines 15-17). The coordinate system can "contain straight line axes that are not necessarily orthogonal to each other" (specification, page 16, lines 20-21). Amended independent claim 1 recites scanning along an axis scan line in a first direction and an axis scan line in a second direction such that the two axis scan lines are not orthogonal to each other.

Moreover, the Office Action stated that the "[C]losest art of record (e.g., Nishida) discloses scanning in orthogonal directions (e.g., rows and columns) but not non-orthogonal one and it would not have been obvious to do so."

The Applicant, therefore, submits that obviousness cannot be established since the combination of Huang et al. and Nishida et al. fails to teach, disclose, suggest or provide any motivation for the feature of "generating a frequency distribution of pixel colors for each axis scan line in a first direction and for each axis scan line in a second direction of the scanned image, wherein each axis scan line in the first direction and each axis scan line in the second direction are not orthogonal to each other" as recited in claim 1. In addition to explicitly lacking this feature, the combination of Huang et al. and Nishida et al. fails to implicitly disclose, suggest, or provide motivation for this feature. Further, the combination also fails to appreciate advantages of this claimed feature.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Huang et al. and Nishida et al. cannot render amended independent claim 1 obvious because both Huang et al. and Nishida et al. are missing at least the material feature recited in

claim 1, as discussed above. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicant respectfully submits that amended independent claim 1 is patentable under 35 U.S.C. § 103(a) over Huang et al. in view of Nishida et al. based on the amendments to claim 1 and the legal and technical arguments set forth above and below. Moreover, claims 2, 3, 5-7, 9, 11, and 12 depend from amended independent claim 1 and are also nonobvious over Huang et al. in view of Nishida et al. (MPEP § 2143.03). The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claims 1-3, 5-7, 9, 11, and 12 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Nishida et al.

Amended Independent Claim 18

Amended independent claim 18 recites a background color estimation system for estimating a background color of a scanned image. The system includes a first axis scan line in a first direction and a second axis scan line in a second direction, the first axis scan line and the second axis scan line being non-orthogonal to each other, and a candidate color extractor that extracts candidate background colors from the scanned image by computing a frequency distribution of pixel colors for the first axis scan line and the second axis scan line of the scanned image. The system further includes a candidate color list that is populated with candidate background colors extracted by the candidate color extractor, and a candidate color frequency module that examines the candidate color list and designates the most common candidate color in the list as the estimated background color.

Similar to claim 1, amended independent claim 18 recites "a first axis scan line in a first direction and a second axis scan line in a second direction, the first axis scan line and the second axis scan line being non-orthogonal to each other."

As stated above, the Office Action stated that the "[C]losest art of record (e.g., Nishida) discloses scanning in orthogonal directions (e.g., rows and columns) but not non-orthogonal one and it would not have been obvious to do so."

The Applicant, therefore, submits that obviousness cannot be established since the combination of Huang et al. and Nishida et al. fails to teach, disclose, suggest or provide any motivation for the feature of "a first axis scan line in a first direction and a second axis scan line in a second direction, the first axis scan line and the second axis scan line being non-orthogonal to each other" as recited in claim 18. In addition to explicitly lacking this feature, the combination of Huang et al. and Nishida et al. fails to implicitly disclose, suggest, or provide motivation for this feature. Further, the combination also fails to appreciate advantages of these claimed features.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Huang et al. and Nishida et al. cannot render amended independent claim 18 obvious because both Huang et al. and Nishida et al. are missing at least the material feature recited in claim 1, as discussed above. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicant respectfully submits that amended independent claim 18 is patentable under 35 U.S.C. § 103(a) over Huang et al. in view of Nishida et al. based on the amendments to claim 18 and the legal and technical arguments set forth above and below. The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Nishida et al.

Amended Independent Claim 13

Amended independent claim 13 recites a computer-readable medium having computer-executable instructions for processing a scanned image containing objects to obtain a background color of the scanned image. The instructions include computing a histogram of pixel colors for each row and each column of the scanned image, determining a most common pixel color in each histogram by examining pixel frequency values, designating a pixel color of each histogram as a candidate background color when a pixel frequency value of the pixel color is greater than a frequency threshold, and adding the candidate background color to a list of candidate background colors. The instructions also include computing a most common candidate background color in the candidate background color list, designating the most common candidate background color as an estimated background color, estimating a variance of the estimated background color by examining the associated histogram, and detecting and segregating the objects within the scanned image using the variance of the estimated background color.

The Applicant's specification states that "one application where estimating the background color is essential to the success of the technique is the detection and extraction of objects in scanned images. Such a technique is described in U.S. Serial Number 10/354,500 by Herley entitled "System and method for automatically detecting and extracting objects in digital image data" filed on January 29, 2003. This particular object detection and extraction system searches for gaps in the histograms of rows and columns of a scanned image containing multiple objects. A gap means that there are no data pixels going across that row or column of the image. These gaps are found by classifying pixels as either data pixels or background pixels and repeatedly decomposing the image into a case with a single object and a background. Once the decomposition is complete, the single object case can easily be solved. Gaps are determined by taking profiles of a histogram. A data pixel is defined as a pixel that differs by at least a threshold from the background color. In order to correctly find the gaps, the background color needs to be accurately estimated" (specification, page 2, lines 8-22). Moreover, the "object detection and extraction system 110 generally detects and segregates objects in a scanned image by classifying each pixel in the

image as a data pixel (on an object in the image) or a background pixel (not on an object)" (specification, page 19, lines 25-27).

In contrast, Huang et al. merely disclose a system and method for processing an input image to remove background color from an input image, including using a histogram to calculate a dominant color of the input image. Nowhere do Huang et al. teach the Applicant's claimed feature of detecting and segregating the objects within the scanned image using the variance of the estimated background color.

Moreover, Nishida et al. add nothing to the cited combination that would render obvious Applicant's claim 13. In particular, Nishida et al. disclose estimating background colors locally using color thresholding to generate an initial estimate of a restored image, where the restored image is to correct an original image having show-through effects. However, nowhere do Nishida et al. teach the Applicant's claimed feature of detecting and segregating the objects within the scanned image using the variance of the estimated background color.

The combination of Huang et al. and Nishida et al. also fails to appreciate or recognize the advantages of detecting and segregating the objects within the scanned image using the variance of the estimated background color. More specifically, this claimed feature is used to "determine the number of objects and the size, orientation and position of each object contained in the digital image data. The system 110 achieves this by determining the boundaries of each object and automatically segregating the objects into separate image objects. This spares the user the time and effort of performing manual segregation of each object" (specification, page 8, lines 8-13). Neither Huang et al. nor Nishida et al. discuss or appreciate these advantages of this feature recited in the Applicant's claim 13.

The Applicant, therefore, submits that obviousness cannot be established since the combination of Huang et al. and Nishida et al. fails to teach, disclose, suggest or provide any motivation for the feature of "detecting and segregating the objects within the scanned

image using the variance of the estimated background color" as recited in claim 13. In addition to explicitly lacking this feature, the combination of Huang et al. and Nishida et al. fails to implicitly disclose, suggest, or provide motivation for this feature. Further, the combination also fails to appreciate advantages of this claimed feature.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Huang et al. and Nishida et al. cannot render amended independent claim 13 obvious because both Huang et al. and Nishida et al. are missing at least the material feature recited in claim 13, as discussed above. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicant respectfully submits that amended independent claim 13 is patentable under 35 U.S.C. § 103(a) over Huang et al. in view of Nishida et al. based on the amendments to claim 13 and the legal and technical arguments set forth above and below. Moreover, claim 14 depends from amended independent claim 13 and is also nonobvious over Huang et al. in view of Nishida et al. (MPEP § 2143.03). The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Nishida et al.

The Office Action rejected claims 8, 10, 15, and 16 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. and Nishida et al. in view of Sato (JP 40-108227). The Office Action contended that the combination of Huang et al., Nishida et al., and Sato teach all the elements recited in these claims.

In response, the Applicant respectfully traverses these rejections. As mentioned above, the Applicant submits that the combination of Huang et al., Nishida et al., and Sato

is lacking several elements of the Applicant's claimed invention. More specifically, neither Huang et al., Nishida et al., nor Sato disclose, either explicitly or implicitly, the material claimed features of:

1. (recited in amended independent claim 1): generating a frequency distribution of pixel colors for each axis scan line in a first direction and for each axis scan line in a second direction of the scanned image, wherein each axis scan line in the first direction and each axis scan line in the second direction are not orthogonal to each other;

2. (recited in amended independent claim 13): detecting and segregating the objects within the scanned image using the variance of the estimated background color.

Further, the combination fails to appreciate the advantages of these claimed features. In addition, there is no technical suggestion or motivation disclosed in either Huang et al., Nishida et al., or Sato to define these claimed features. Thus, the Applicant submits that the combination of Huang et al., Nishida et al., and Sato cannot make obvious the Applicant's claimed features listed above.

Regarding the feature recited in claim 1, as has already been stated the Office Action stated that this feature is not taught in the cited art.

Regarding the feature recited in claim 13, Sato adds nothing to the cited combination that would render obvious Applicant's claim 13. In particular, Sato merely discloses calculating a binarization threshold value of an image. Nowhere, however, does Sato teach the Applicant's claimed feature of detecting and segregating the objects within the scanned image using the variance of the estimated background color. In addition, the combination of Huang et al, Nishida et al., and Sato also fails to appreciate or recognize the advantages of the Applicants' claimed feature of detecting

and segregating the objects within the scanned image using the variance of the estimated background color.

The Applicant, therefore, submits that obviousness cannot be established since the combination of Huang et al, Nishida et al., and Sato fails to teach, disclose, suggest or provide any motivation for the Applicant's claimed features recited in claims 1 and 13. In addition to explicitly lacking this feature, Huang et al, Nishida et al., and Sato fail to implicitly disclose, suggest, or provide motivation for these features. Further, the combination also fails to appreciate the advantages of these claimed features.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Huang et al, Nishida et al., and Sato cannot render the Applicant's claims 1 and 13 obvious because Huang et al, Nishida et al., and Sato are missing material features recited in these claims. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicant respectfully submits that amended independent claims 1 and 13 are patentable under 35 U.S.C. § 103(a) over Huang et al. and Nishida et al. in view of Sato based on the amendments to claims 1 and 13 and the legal and technical arguments set forth above and below. Moreover, claims 8 and 10 depend from amended independent claim 1 and claims 15 and 16 depend from amended independent claim 13 and are also nonobvious over Huang et al. and Nishida et al. in view of Sato (MPEP § 2143.03). The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claims 8, 10, 15, and 16 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. and Nishida et al. in view of Sato.

The Office Action rejected claims 11, 17, and 19-24 under 35 U.S.C. § 103(a) as

being unpatentable over Huang et al. and Nishida et al. in view of Yaguchi (U.S. Patent No. 7,099,042). The Office Action contended that the combination of Huang et al., Nishida et al., and Yaguchi teach all the elements recited in these claims.

In response, the Applicant respectfully traverses these rejections. As mentioned above, the Applicant submits that the combination of Huang et al., Nishida et al., and Yaguchi is lacking several elements of the Applicant's claimed invention. More specifically, neither Huang et al., Nishida et al., nor Yaguchi disclose, either explicitly or implicitly, the material claimed features of:

1. (recited in amended independent claim 1): generating a frequency distribution of pixel colors for each axis scan line in a first direction and for each axis scan line in a second direction of the scanned image, wherein each axis scan line in the first direction and each axis scan line in the second direction are not orthogonal to each other;

2. (recited in amended independent claim 13): detecting and segregating the objects within the scanned image using the variance of the estimated background color.

3. (recited in amended independent claim 18): a first axis scan line in a first direction and a second axis scan line in a second direction, the first axis scan line and the second axis scan line being non-orthogonal to each other;

Further, the combination fails to appreciate the advantages of these claimed features. In addition, there is no technical suggestion or motivation disclosed in either Huang et al., Nishida et al., or Yaguchi to define these claimed features. Thus, the Applicant submits that the combination of Huang et al., Nishida et al., and Yaguchi cannot make obvious the Applicant's claimed features listed above.

Regarding the features recited in claims 1 and 18, as has already been stated the Office Action stated that these features are not taught in the cited art.

Regarding the feature recited in claim 13, Yaguchi adds nothing to the cited combination that would render obvious Applicant's claim 13. In particular, Yaguchi merely discloses a scanning device having an automatic density adjustment function. Nowhere, however, does Yaguchi teach the Applicant's claimed feature of detecting and segregating the objects within the scanned image using the variance of the estimated background color. In addition, the combination of Huang et al, Nishida et al., and Yaguchi also fails to appreciate or recognize the advantages of the Applicants' claimed feature of detecting and segregating the objects within the scanned image using the variance of the estimated background color.

The Applicant, therefore, submits that obviousness cannot be established since the combination of Huang et al, Nishida et al., and Yaguchi fails to teach, disclose, suggest or provide any motivation for the Applicant's claimed features recited in claims 1, 13, and 18. In addition to explicitly lacking this feature, Huang et al, Nishida et al., and Yaguchi fail to implicitly disclose, suggest, or provide motivation for these features. Further, the combination also fails to appreciate the advantages of these claimed features.

Therefore, as set forth in *In re Fine* and MPEP § 2142, the combination of Huang et al, Nishida et al., and Yaguchi cannot render the Applicant's claims 1, 13, and 18 obvious because Huang et al, Nishida et al., and Yaguchi are missing material features recited in these claims. Consequently, because a prima facie case of obviousness cannot be established due to the lack of "some teaching, suggestion, or incentive supporting the combination", the rejection must be withdrawn. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984); MPEP 2143.01.

Accordingly, the Applicant respectfully submits that amended independent claims 1, 13, and 18 are patentable under 35 U.S.C. § 103(a) over Huang et al. and Nishida et al. in view of Yaguchi based on the amendments to claims 1, 13, and 18, and the legal and

technical arguments set forth above. Moreover, claim 11 depends from amended independent claim 1, claim 17 depends from amended independent claim 13, and claims 19-24 depend from amended independent claim 18 and are also nonobvious over Huang et al. and Nishida et al. in view of Yaguchi (MPEP § 2143.03). The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claims 11, 17, and 19-24 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. and Nishida et al. in view of Yaguchi.

Conclusion

In view of the amendments to claims 1, 13, and 18, and the arguments set forth above, the Applicant submits that claims 1-3, 5-14, and 17-24 are in condition for immediate allowance. The Examiner, therefore, is respectfully requested to withdraw the outstanding rejections of the claims and to pass all of the pending claims of this application to issue.

In an effort to expedite and further the prosecution of the subject application, the Applicant kindly invites the Examiner to telephone the Applicant's attorney at (805) 278-8855 if the Examiner has any comments, questions or concerns, wishes to discuss any aspect of the prosecution of this application, or desires any degree of clarification of this response.

Respectfully submitted,
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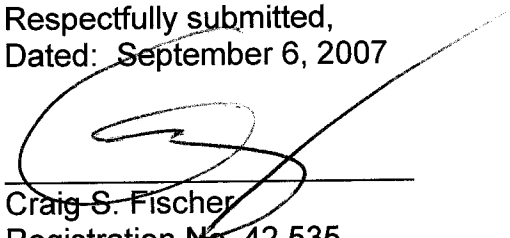

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